

WHAT IS CLAIMED IS:

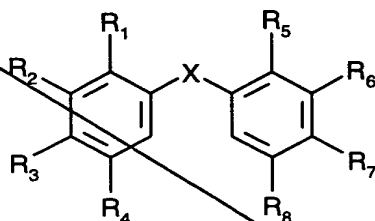
1. A process for increasing the molecular weight and/or viscosity of a polyamide, a polyester, a polycarbonate or a copolymer of these polymers which remain thermoformable after the process, which comprises heating a polyamide, a polyester, a polycarbonate or a copolymer of these polymers, with addition of at least one aromatic dicyanate, at above the melting point or glass transition point of the polyamide, polyester, polycarbonate or copolymer of these polymers.

2. A process according to claim 1, wherein at least one polyfunctional compound selected from the ^{group consisting} ~~class~~ of the sterically hindered hydroxyphenyl-alkyl-phosphonic esters and monoesters, diphosponites and secondary aromatic amines is additionally employed.

3. A process according to claim 2, wherein at least one difunctional epoxide is additionally employed.

4. A process according to claim 1, wherein the polyamide, polyester, polycarbonate or a copolymer of these polymers is a polyamide-, a polyester-, a polycarbonate- or a copolymer of these polymers-recyclate.

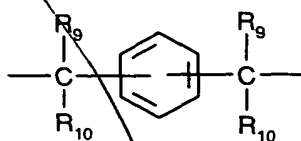
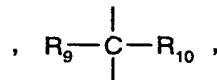
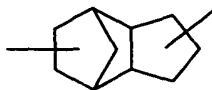
5. A process according to claim 1, wherein the aromatic dicyanate is a compound of the formula I



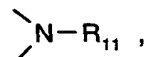
(I)

in which

X is a direct bond, oxygen, sulfur, -SO-, -SO₂-,



, C₂-C₁₈alkylene, C₂-C₁₈alkenylene or



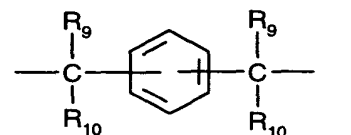
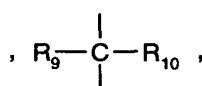
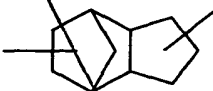
R₁, R₂, R₃ and R₄ independently of one another are hydrogen, C₁-C₂₅alkyl, C₅-C₁₂cycloalkyl, unsubstituted or C₁-C₄alkyl-substituted phenyl; C₇-C₉phenylalkyl, hydroxyl, C₁-C₂₅alkoxy or -O-CN, with the proviso that at least one of the radicals R₁, R₂, R₃ and R₄ is -O-CN,

R₅, R₆, R₇ and R₈ independently of one another are hydrogen, C₁-C₂₅alkyl, C₅-C₁₂cycloalkyl, unsubstituted or C₁-C₄alkyl-substituted phenyl; C₇-C₉phenylalkyl, hydroxyl, C₁-C₂₅alkoxy or -O-CN, with the proviso that at least one of the radicals R₅, R₆, R₇ and R₈ is -O-CN,

R₉ and R₁₀ independently of one another are hydrogen, C₁-C₁₂alkyl, trifluoromethyl or phenyl, or R₉ and R₁₀, together with the carbon atom to which they are attached, form a C₅-C₈cycloalkylidene ring which is unsubstituted or is substituted by 1 to 3 C₁-C₄alkyls; and R₁₁ is hydrogen or C₁-C₁₂alkyl.

6. A process according to claim 5, wherein

X is a direct bond, oxygen,



C₂-C₁₂alkylene or C₂-C₁₂alkenylene,

R₁, R₂, R₃ and R₄ independently of one another are hydrogen, C₁-C₁₈alkyl, C₅-C₈cycloalkyl, phenyl, benzyl, C₁-C₁₈alkoxy or -O-CN, with the proviso that at least one of the radicals R₁, R₂, R₃ or R₄ is -O-CN,

R₅, R₆, R₇ and R₈ independently of one another are hydrogen, C₁-C₁₈alkyl, C₅-C₈cycloalkyl, phenyl, benzyl, C₁-C₁₈alkoxy or -O-CN, with the proviso that at least one of the radicals R₅, R₆, R₇ or R₈ is -O-CN, and

R₉ and R₁₀ independently of one another are hydrogen, C₁-C₈alkyl, trifluoromethyl or phenyl, or R₉ and R₁₀, together with the carbon atom to which they are attached, form a C₅-C₆cycloalkylidene ring.

7. A process according to claim 5, wherein

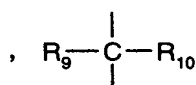
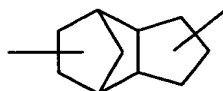
R₁ and R₅ are hydrogen,

R₂, R₄, R₆ and R₈ are hydrogen or methyl, and

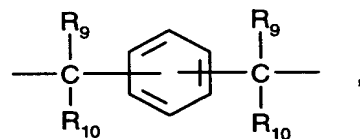
R₃ and R₇ are -O-CN.

8. A process according to claim 5, wherein

X is a direct bond,



or



R₁ is hydrogen,

R₂ is hydrogen or C₁-C₄alkyl,

R₃ is -O-CN,

R₄ is hydrogen or C₁-C₄alkyl,

R₅ is hydrogen,

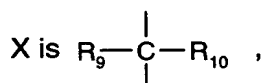
R₆ is hydrogen or C₁-C₄alkyl,

R₇ is -O-CN,

R₈ is hydrogen or C₁-C₄alkyl, and

R₉ and R₁₀ independently of one another are hydrogen, methyl or trifluoromethyl.

9. A process according to claim 5, wherein



R₁ and R₂ are hydrogen,

R₃ is -O-CN,

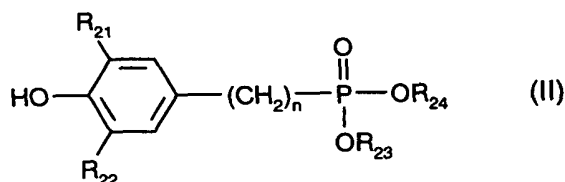
R₄, R₅ and R₆ are hydrogen,

R₇ is -O-CN,

R₈ is hydrogen, and

R₉ and R₁₀ independently of one another are hydrogen or methyl.

10. A process according to claim 2, wherein the polyfunctional compound ^{is a} ~~from the class of~~ ^{sterically hindered hydroxyphenyl-alkyl-phosphonic esters and monoesters} ~~is a~~ ^{compound} of the formula II



in which

R_{21} is isopropyl, tert-butyl, cyclohexyl or cyclohexyl which is substituted by 1 to 3 $\text{C}_1\text{-C}_4$ alkyl groups,

R_{22} is hydrogen, $\text{C}_1\text{-C}_4$ alkyl, cyclohexyl or cyclohexyl which is substituted by 1 to 3 $\text{C}_1\text{-C}_4$ alkyl groups,

R_{23} is $\text{C}_1\text{-C}_{20}$ alkyl, or unsubstituted or $\text{C}_1\text{-C}_4$ alkyl-substituted phenyl or naphthyl,

R_{24} is hydrogen, $\text{C}_1\text{-C}_{20}$ alkyl, unsubstituted or $\text{C}_1\text{-C}_4$ alkyl-substituted phenyl or naphthyl; or

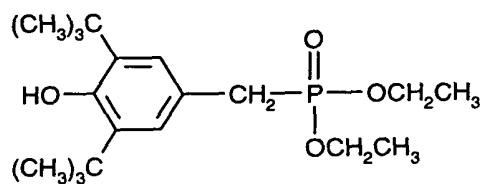
is $\frac{\text{M}^{r+}}{r}$,

M^{r+} is an r-valent metal cation,

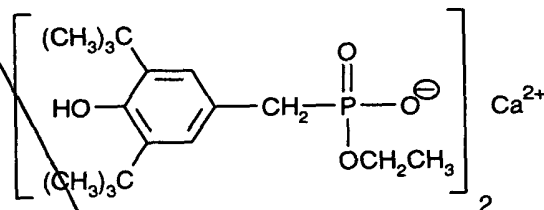
n is 1, 2, 3, 4, 5 or 6, and

r is 1, 2 or 3.

11. A process according to claim 2, wherein the polyfunctional compound ^{is a} ~~from the class of~~ ^{the} sterically hindered hydroxyphenyl-alkyl-phosphonic esters ^{or} ~~and monoesters~~ ^{is a} ~~compound~~ of the formula IIa or IIb

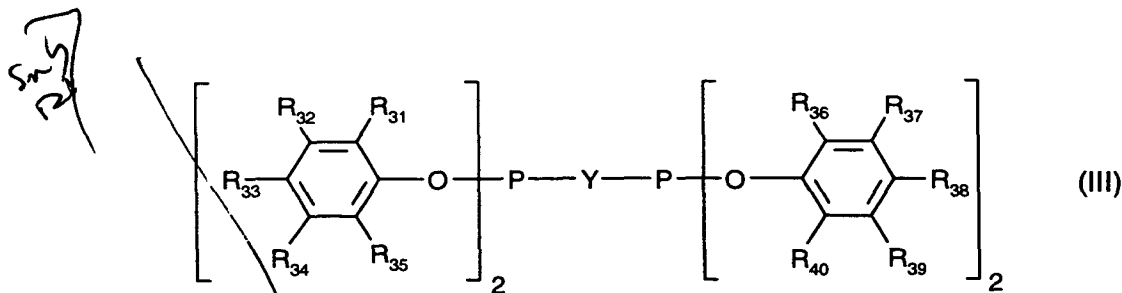


(IIa)




(IIb)

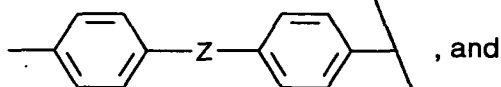
12. A process according to claim 2, wherein the polyfunctional compound ^{is a} ~~from the class of~~ ^{the} diphosphonites ^{is a compound} of the formula III



in which

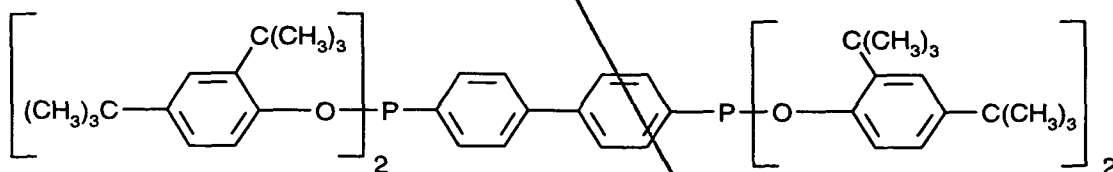
R_{31} , R_{32} , R_{33} , R_{34} , R_{35} , R_{36} , R_{37} , R_{38} , R_{39} and R_{40} independently of one another are hydrogen or C_1 - C_8 alkyl,

Y is 1,4-phenylene, 1,3-phenylene,  or



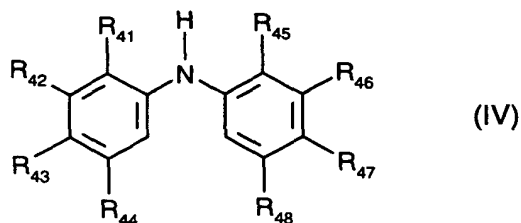
Z is a direct bond, phenylene, oxygen, sulfur, -SO-, -SO₂- or $>C=O$.

13. A process according to claim 2, wherein the polyfunctional compound ~~from the class of the diposphonites~~ ^{is a} ~~is a compound~~ of the formula IIIa



(IIIa)

14. A process according to claim 2, wherein the polyfunctional compound ~~from the class of the secondary aromatic amines~~ ^{is a} ~~is a compound~~ of the formula IV



in which

R₄₁ is hydrogen or C₁-C₂₅alkyl,

R₄₂ is hydrogen, C₁-C₂₅alkyl or benzyl,

R₄₃ is hydrogen, C₁-C₂₅alkyl, C₅-C₁₂cycloalkyl, benzyl, α-methylbenzyl or α,α-dimethylbenzyl;

or R₄₂ and R₄₃ together form a divalent group ,

R₄₄ is hydrogen, C₁-C₂₅alkyl or benzyl,

R₄₅ is hydrogen or C₁-C₂₅alkyl,

R₄₆ is hydrogen, C₁-C₂₅alkyl or benzyl,

R₄₇ is hydrogen, C₁-C₂₅alkyl, C₅-C₁₂cycloalkyl, benzyl, α-methylbenzyl, α,α-dimethylbenzyl or

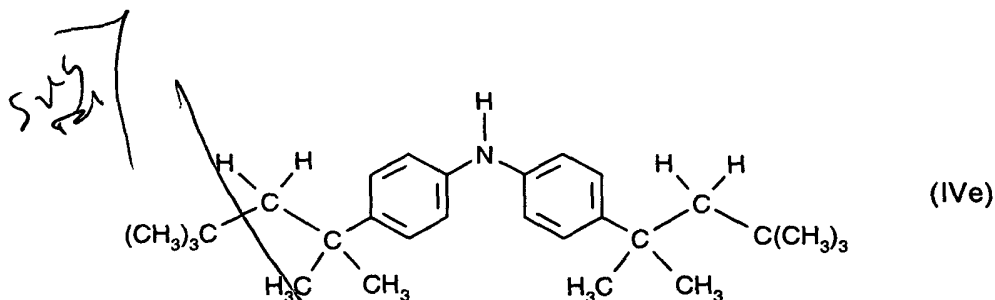
; or R₄₆ and R₄₇ together form a divalent group ,

R₄₈ is hydrogen, C₁-C₂₅alkyl or benzyl,

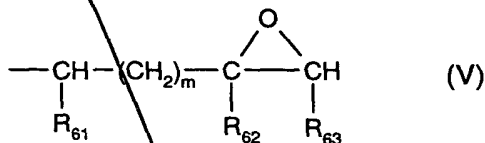
R₄₉ is hydrogen or C₁-C₂₅alkyl, and

R₅₀ is C₅-C₁₂cycloalkyl, or .

15. A process according to claim 2, wherein the polyfunctional compound ^{is a} ~~from the class of~~ the secondary aromatic amines ~~is a compound~~ of the formula IVe



16. A process according to claim 3, wherein the difunctional epoxide is a compound which contains epoxide radicals of the formula V



which are attached directly to carbon, oxygen, nitrogen or sulfur atoms and in which R_{61} and R_{63} are both hydrogen, R_{62} is hydrogen or methyl and m is 0; or in which R_{61} and R_{63} together are $-\text{CH}_2\text{CH}_2-$ or $-\text{CH}_2\text{CH}_2\text{CH}_2-$, R_{62} is then hydrogen and m is 0 or 1.

17. A process according to claim 3, wherein the difunctional epoxide is bisphenol A diglycidyl ether or bisphenol F diglycidyl ether.

18. A process according to claim 1, wherein from 0.01 to 5 parts by weight of the aromatic dicyanate are employed per 100 parts by weight of a polyamide, a polyester, a polycarbonate or a copolymer of these polymers.

19. A process according to claim 2, wherein from 0.01 to 5 parts by weight of the polyfunctional compound are employed per 100 parts by weight of a polyamide, a polyester, a polycarbonate or a copolymer of these polymers.

20. A process according to claim 3, wherein from 0.01 to 5 parts by weight of the difunctional epoxide are employed per 100 parts by weight of a polyamide, a polyester, a polycarbonate or a copolymer of these polymers.

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~~21.~~ A process according to claim 1, wherein the polycondensate is a polyamide, a polyester, a polycarbonate or a copolymer of these polymers.

22. A process according to claim ¹~~21~~, wherein the polyamide is a polyamide 6 or polyamide 6.6 or a corresponding recycle or copolymer thereof.

¹
23. A process according to claim ¹~~21~~, wherein the polyester is a polyethylene terephthalate or polybutylene terephthalate or a corresponding recycle or copolymer thereof.

24. A process according to claim 1, wherein the polymer is a polybutylene terephthalate/polycarbonate blend or a blend comprising predominantly polybutylene terephthalate/polycarbonate or a corresponding recycle or a blend of a recycle and a virgin polymer component.

~~25.~~ The use of an aromatic dicyanate for increasing the molecular weight and/or viscosity of virgin polycondensate or polycondensate recycle.

~~26.~~ The use of a mixture comprising an aromatic dicyanate and, in addition, at least one polyfunctional compound selected from the class of sterically hindered hydroxyphenyl-alkyl-phosphonic esters and monoesters, diphosponites and secondary aromatic amines for increasing the molecular weight and/or viscosity of virgin polycondensate or polycondensate recycle.

~~27.~~ The use of a mixture comprising (i) an aromatic dicyanate, (ii) at least one polyfunctional compound selected from the class of sterically hindered hydroxyphenyl-alkyl-phosphonic esters and monoesters, diphosponites and secondary aromatic amines, and (iii) a difunctional epoxide for increasing the molecular weight and/or viscosity of virgin polycondensate or polycondensate recycle.

28. A composition comprising
a) a polyamide, a polyester, a polycarbonate or a copolymer of these polymers,
b) an aromatic dicyanate, and

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|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 | 2105 | 2106 | 2107 | 2108 | 2109 | 2110 | 2111 | 2112 | 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 | 2128 | 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 | 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 | 2144 | 2145 | 2146 | 2147 | 2148 | 2149 | 2150 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 | 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 | 2185 | 2186 | 2187 | 2188 | 2189 | 2190 | 2191 | 2192 | 2193 | 2194 | 2195 | 2196 | 2197 | 2198 | 2199 | 2200 | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 | 2208 | 2209 | 2210 | 2211 | 2212 | 2213 | 2214 | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 | 2224 | 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 | 2233 | 2234 | 2235 | 2236 | 2237 | 2238 | 2239 | 2240 | 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2249 | 2250 | 2251 | 2252 | 2253 | 2254 | 2255 | 2256 | 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 | 2264 | 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 | 2272 | 2273 | 2274 | 2275 | 2276 | 2277 | 2278 | 2279 | 2280 | 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 | 2288 | 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 | 2297 | 2298 | 2299 | 2300 | 2301 | 2302 | 2303 | 2304 | 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 | 2316 | 2317 | 2318 | 2319 | 2320 | 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 | 2329 | 2330 | 2331 | 2332 | 2333 | 2334 | 2335 | 2336 | 2337 | 2338 | 2339 | 2340 | 2341 | 2342 | 2343 | 2344 | 2345 | 2346 | 2347 | 2348 | 2349 | 2350 | 2351 | 2352 | 2353 | 2354 | 2355 | 2356 | 2357 | 2358 | 2359 | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 | 2368 | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 | 2377 | 2378 | 2379 | 2380 | 2381 | 2382 | 2383 | 2384 | 2385 | 2386 | 2387 | 2388 | 2389 | 2390 | 2391 | 2392 | 2393 | 2394 | 2395 | 2396 | 2397 | 2398 | 2399 | 2400 | 2401 | 2402 | 2403 | 2404 | 2405 | 2406 | 2407 | 2408 | 2409 | 2410 | 2411 | 2412 | 2413 | 2414 | 2415 | 2416 | 2417 | 2418 | 2419 | 2420 | 2421 | 2422 | 2423 | 2424 | 2425 | 2426 | 2427 | 2428 | 2429 | 2430 | 2431 | 2432 | 2433 | 2434 | 2435 | 2436 | 2437 | 2438 | 2439 | 2440 | 2441 | 2442 | 2443 | 2444 | 2445 | 2446 | 2447 | 2448 | 2449 | 2450 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|